Abstract

The present invention describes a unique method and apparatus for applying near-infrared spectroscopy to estimate weight percent of methane in crude oil from which one can then infer gas-oil ratio (GOR) of crude oils downhole in real time while collecting a fluid sample. The correlation equations provided by this invention use two wavelengths, one centered at 1670 and the other centered at 1682 nm. Both wavelengths are primarily sensitive to the methane peak absorption. To significantly improve the fit, non-spectroscopic parameters, such as temperature or pressure, can be included in the correlation equation. Also, this invention can be used to monitor sample cleanup by monitoring the increase in GOR associated with cleanup as a fluid being pumped from the formation transitions from mostly gas-free filtrate to mostly gas-containing crude oil.